

Multiple-Band Antenna With Shared Slot Structure

FIELD OF THE INVENTION

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7/24/06* This application is a 371 of PCT/CA02/01943 filed on Dec. 6, 2002. This invention relates generally to the field of antennas. More specifically, a

5 multiple-band antenna is provided that is particularly well-suited for use in wireless mobile communication devices, generally referred to herein as "mobile devices", such as Personal Digital Assistants, cellular telephones, and wireless two-way email communication devices.

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BACKGROUND OF THE INVENTION

Mobile devices having structures that support multi-band communications are known. Many such mobile devices utilize helix, "inverted F" or retractable structures. Helix and retractable antennas are typically installed outside of a mobile device, and inverted F antennas are typically embedded inside of a case or housing of a device. 15 Generally, embedded antennas are preferred over external antennas for mobile communication devices for mechanical and ergonomic reasons. Embedded antennas are protected by the mobile device case or housing and therefore tend to be more durable than external antennas. Although external antennas may physically interfere with the surroundings of a mobile device and make a mobile device difficult to use, particularly in 20 limited-space environments, embedded antennas present fewer such challenges.

In some types of mobile devices, however, known embedded structures and design techniques provide relatively poor communication signal radiation and reception, at least in certain operating positions of the mobile devices. One of the biggest challenges for mobile device antenna design is to ensure that the antenna operates effectively in